British Journal of Venereal Diseases, 1977, **53**, 73–79

Abstracts

These selected abstracts and titles from the world literature are arranged in the following sections:

Syphilis and other treponematoses (Clinical and therapy)

Anaemia as the only presenting manifestation of congenital syphilis

A. D. LASCARI, J. DIAMOND, AND B. E. NOLAN (1976). *Clinical Pediatrics*, **15**, 90

A three-month-old white male infant was admitted to hospital for investigation of anaemia. An initial diagnosis of gastro-intestinal bleeding was made, but a barium study was normal and the stools showed no occult blood. Although the haemoglobin level dropped from 11 g to 7·6 g/100 ml in a period of 11 days no demonstrable blood loss had occurred, suggesting that the anaemia was of haemolytic origin. Haematological findings were consistent with the presence of haemolysis and an inflammatory process.

The infant's mother happened to be in another hospital at the time. Although her RPR had been negative at confinement it was now reactive at a dilution of 1: 64, and the FTA-ABS was also reactive. Apart from the anaemia, the infant showed no clinical evidence of congenital syphilis, but his blood tests were as strongly reactive as those of his mother. Radiographs of his long bones showed the classical Wimberger's sign and the cerebrospinal fluid showed elevation of cells and protein with a reactive VDRL.

Transfusion of 75 ml of packed red cells followed by a course of procaine penicillin resulted in rapid recovery, the haemoglobin being 13·5 g/100 ml three months later.

The authors suggest that congenital syphilis should always be considered in the differential diagnosis of anaemia in infancy and recommend that routine serological tests for syphilis be done on every sick infant. *C. S. Ratnatunga*

Fetal syphilis in the first trimester

C. A. HARTER AND K. BENIRSCHKE (1976). *American Journal of Obstetrics and Gynaecology*, **124**, 705

The authors collected the products of 114 therapeutic abortions judged to be less than 12 weeks' gestation. Biopsies were taken from villous material and from any fetal body parts that were seen; however, in 44% of the cases only placental tissue was available.

The VDRL and FTA-ABS tests were performed on the maternal blood. Five patients were found to have untreated syphilis. In addition, one had treated congenital syphilis, one had treated latent syphilis, and one showed a false-positive VDRL with negative FTA-ABS. No patient, apart from the woman with treated latent syphilis, gave a history of a chancre, and none of those with previous children had had a congenital syphilitic infant.

The biopsies were examined by fluorescent antibody staining (using the indirect technique with known 4+ human positive serum and conjugated anti-human globulin), and by silver impregnation using the Warthin-Starry method. The conception products of two untreated patients, one of 9 weeks' and the other of 10 weeks' gestation, showed treponeme-like organisms on silver staining in the fetal tissue, one also having treponeme-like organisms in the placenta. They also showed treponeme-like forms with immunofluorescent staining. Adequate controls were performed for both the silver staining and the immunofluorescence.

The authors discuss the theory that the Langhans layer acts as a protective barrier. They conclude that previous authors were unable to obtain abortion material from early fetuses because only the products of spontaneous abortions were available for examination, and syphilis does not readily cause a first trimester abortion. They consider another reason for earlier failures to be shortage of fresh material and possibly lack of application in searching for the treponeme.

The authors conclude that the Langhans layer is no barrier to invasion of the fetus by *Treponema pallidum*.

This is a very interesting paper, worth reading in its original form.

G. D. Morrison

Bone lesions in early congenital syphilis

E. U. ROSEN AND A. SOLOMON (1976). *South African Medical Journal*, **50**, 135

Radiological changes in long bones of 112 congenital syphilitic black infants aged between one day and nine months, with positive FTA-ABS IgM tests, were compared with a similar number of healthy infants matched for age.

Five of the syphilitic infants, three of whom were under one month, had normal radiographs. In the 107 showing bone

lesions, the lower limbs were more often involved than the upper limbs, and the tibias were the bones most commonly affected. Metaphysitis with periostitis was found in 62 patients, metaphysitis alone in 21, and periostitis alone in 24. Rarefaction of the juxta-epiphyseal area, seen as a thin line or a wide zone of translucency, occurred as an isolated finding in 17 patients, 14 of whom were under a month old, suggesting that these transverse lesions are the earliest radiological evidence of syphilis. Wimberger's sign (upper tibial erosions) was seen in 23 infants, mostly over a month old.

In the control group, no metaphyseal lesions were seen, but periosteal reaction was present in 20. Fewer than four bones were usually affected and single-layered reactions were most common, whereas in the 24 syphilitic infants with periostitis alone, more than four bones were affected and double-layered periosteal reaction was more common.

N. A. Durham

Skeletal involvement in secondary syphilis detected by bone scanning R. R. TIGHT AND J. F. WARNER (1976).
Journal of the American Medical Association, **235**, 2326

A case of secondary syphilis is described in a 22-year-old man who was also found to have rectal gonorrhoea. He had a maculopapular rash over the face and the palms of his hands, and tenderness of the left supraorbital ridge and left sternoclavicular joints was present.

Chest, skull, and paranasal sinus radiographs were normal, as were tomograms of the left sternoclavicular joint. However, a technetium 99 m bone scan showed areas of increased activity on the superior lateral aspect of the left orbit, over the mid portion of the frontal bone and in a small area near the upper coronal suture to the left of the mid line as well as at the left sternoclavicular joint and the right clavicle.

Serum serological tests for syphilis were strongly positive; his cerebrospinal fluid was normal. He was successfully treated with a course of intramuscular procaine penicillin.

The authors point out that bone scanning may detect lesions undetected by radiography, and could be used to demonstrate skeletal lesions in early acquired syphilis.

M. A. Waugh

Syphilis (Serology and biological false positive phenomenon)

Studies on the *Treponema pallidum* immobilising activity in normal human serum. 2, Serum factors participating in the normal serum immobilisation reaction. 3, The kinetics of the immobilisation reaction of normal and immune sera. 4, The importance for the outcome of the conventional TPI test
B. HEDERSTEDT (1976).
Acta pathologica et microbiologica Scandinavica, Section C, **84**, 135, 142, 148

2. The majority of unheated normal human sera will immobilise *Treponema pallidum* in the presence of complement. This activity is lost after heating to 48–49°C for an hour or if stored at temperatures above 4°C. Both immobilising and haemolytic activity were found to be stable for at least 16 months in sera stored at −60°C. Immobilising activity is due to an IgM class antibody which can be removed by absorption with *T. pallidum* without affecting the haemolytic titre. The reaction is dependent on the presence of complement which appears to activate via the classical pathway. Lysozyme enhances immobilisation but may not be essential for the reaction. No correlation was found between the immobilising titres of individual sera and their lysozyme content.

3. The rate of immobilisation was more rapid and the lag period before immobilisation started earlier with normal human serum than with human syphilitic serum. When increasing amounts of lysozyme were added to the reaction mixtures, the lag periods were shortened and the rates of immobilisation increased with both types of serum up to a lysozyme concentration of 20 μg/ml. Higher concentrations did not produce further changes in the reaction patterns. When treponemes were incubated for 18 hours with or without 200 μg/ml lysozyme, washed and then incubated with syphilitic serum and complement, no differences in the duration of the lag period were found. This does not support the view that lysozyme removes surface material covering antigenic determinants in treponemes.

4. Treponemal immobilising activity was found in 86 of 100 sera from normal adults and in 91% of sera from 34 infants under one year of age. The titres were low, ranging from <2·0 to 16·5 (50% immobilisation titres). Conventional TPI tests were negative on all these sera.

The 'normal' immobilising titre of sera obtained before treatment of early syphilis tended to be higher than that of normal persons; it returned to normal levels within six months of treatment. No correlation was found between the titres of normal and immune (TPI) antibody in these sera.

Sera from monkeys (cynomolgus and certipiticus), rats, sheep, and dogs were found to contain normal immobilising antibody but not those from rabbits, guinea-pigs, hamsters, mice, and goats. Guinea-pig and rabbit sera inhibited the immobilising effect of normal human serum; this property was found in the 19 S fractions.

Normal and immune immobilising antibodies are thought to act on different treponemal antigens; the presence of the former does not interfere with the conventionally performed TPI test.

A. E. Wilkinson

Studies on the *Treponema pallidum* immobilising activity in normal human serum. 5, On the protective role against syphilis B. HEDERSTEDT (1976).
Acta pathologica et microbiologica Scandinavica, Section C, **84**, 245

When unheated normal human serum was incubated with virulent *Treponema pallidum* for two hours at 35°C, the treponemes were immobilised. Injection of these immobilised organisms into rabbits did not produce lesions or lead to the production of immune antibody, showing that the organisms had been killed. If the serum was heated before mixture with treponemes, these remained motile and were infectious for rabbits.

In tests on Cynomolgus monkeys, no relationship was found between the presence or absence of normal serum antibody and the development of lesions. Studies on 22 patients who were contacts of cases of early syphilis showed that the range and mean titres of normal serum antibody were similar in those who became infected (8) and those who escaped infection (14). The normal immobilising serum antibody is not thought to protect against syphilis.

A. E. Wilkinson

Studies on the *Treponema pallidum* immobilising activity in normal human serum. 6, Antigenic relationship between *T. pallidum* and various mammalian tissues B. HEDERSTEDT (1976). *Acta pathologica et microbiologica Scandinavica*, Section C, **84,** 250

Cynomolgus monkeys whose sera lacked normal immobilising antibody (NIA) were given subcutaneous injections of 2 ml of a suspension of killed *Treponema pallidum* or homogenates of HeLa cells, monkey, rabbit, guinea-pig, or rat testicular tissue. In all except those given monkey tissue NIA was found to develop. Four normal human sera containing NIA were absorbed with the same reagents. Absorption with *T. pallidum* removed NIA activity. This was reduced by absorption with the other reagents except monkey tissue and HeLa cells. Mammalian tissues are thought to possess antigens which are also present in *T. pallidum*.

A. E. Wilkinson

Seroreversal after treatment of secondary syphilis. (Letter).
I. L. SCHAMBERG (1976). *Archives of Dermatology*, **112,** 729

Gonorrhoeae (Clinical)

Gonorrhoea in obstetric patients
D. E. D. JONES, R. G. BRAME AND C. P. JONES (1976). *Journal of the American Venereal Diseases Association*, **2,** 30

Gonorrhoea (Microbiology)

Characteristics of atypical *Neisseria gonorrhoeae* from disseminated and localised infections
J. A. MORELLO, S. A. LERNER AND M. BOHNHOFF (1976). *Infections and Immunology*, **13,** 1510

Atypical strains of *N. gonorrhoeae* are described which require arginine, hypoxanthine, and uracil (AHU), or just arginine and uracil (AU), for growth. They were identified by the formation of small colonies on chocolate agar and weak acid formation with glucose, and they formed about 6% of 1200 clinical isolates. These small colony isolates were all penicillin sensitive at 0·02 μg/ml.

The incidence of disseminated gonorrhoea due to this auxotype was 44%, compared with 89% in the series of Knapp and Holmes at Seattle; these authors (Knapp and Holmes, 1975) also found atypical strains in 39% of uncomplicated infections, while the Chicago workers here found them in only 4·7%.

The enhanced invasive ability of these strains remains unexplained.

Brian A. Evans

Reference
Knapp, J. S., and Holmes, K. K. (1975). *Journal of Infectious Diseases*, **132,** 204

Immunity in infection with *Neisseria gonorrhoeae:* duration and serological response in the chimpanzee.
R. J. ARKO, W. P. DUNCAN, W. J. BROWN, W. L. PEACOCK AND T. TOMIZAWA (1976). *Journal of Infectious Diseases*, **133,** 441

The latest report from Robert Arko and his colleagues records the continuing adventures of Joe, Bit, Barney, and Oscar, together with 12 more male chimpanzees, six of which were given chimpanzee-virulent T1 gonococcal antigen and six a sham vaccine. Unfortunately, the antigen produced severe muscle tenderness and depression after each of the five weekly injections. Subsequent challenge one month later was carried out with graduated doses from the same isolate ($1{\cdot}8 \times 10^3$–$2{\cdot}3 \times 10^3$ cfu) until infection was established in the pharynx or urethra. It transpires that chimpanzee gonorrhoea produced no signs of inflammation in the pharynx and only a small amount of clear fluid in the urethra.

After inoculation, resistance to urethral inoculation varied from being similar to that of uninoculated controls up to a state where a 1000fold increase in the inoculum was required to induce infection. Humoral response was measured by testing for indirect fluorescent, bactericidal, microhaemagglutinating, and complement-fixing antibodies, and the IFA and serum bactericidal tests proved best in distinguishing the degree of resistance conferred by the procedure.

Meanwhile, the original four chimpanzees, immunised with T2 antigen from the same strain, were being challenged periodically over a period of two years. All four showed increased resistance after 12 months (1×10^3 cfu) and Joe resisted a similar inoculum after two years, but the others were infected by smaller doses.

At present, then, immunisation against gonorrhoea is a painful and prolonged procedure, its outcome inconsistent, even for the same strain of organism, in an experimental animal which seems to suffer no ill effects from the infection.

Brian Evans

Identification of *N. gonorrhoeae* in cultures from tonsillo-pharyngeal specimens by means of a slide co-agglutination test (Phadebact gonococcus test) H. MENCK (1976). *Acta pathologica et microbiologica Scandinavica*, **84,** 139

Chemical composition and turnover of peptidoglycan in *N. gonorrhoeae*
B. H. HEBELER AND F. E. YOUNG (1976). *Journal of Bacteriology*, **126,** 1180

Electrophoretic comparison of endonuclease-digested plasmids from *N. gonorrhoeae*
R. S. FOSTER AND G. C. FOSTER (1976). *Journal of Bacteriology*, **126,** 1297

Mechanism of autolysis of *N. gonorrhoeae*
B. H. HEBELER AND F. E. YOUNG (1976). *Journal of Bacteriology*, **126,** 1186

Type and strain variation in induction of L. forms of *Neisseria gonorrhoeae*
F. OTA, F. E. ASHTON AND B. B. DIENA (1976). *Japanese Journal of Microbiology*, **20,** 77

Antibody response to initial infection with *Neisseria gonorrhoeae* in young males
J. D. DYCKMAN, W. C. DUNCAN, R. D. WENDE AND R. P. WILLIAMS (1976). *Journal of the American Venereal Disease Association*, **2,** 25

Gonorrhoea (Therapy)

β-lactamase-producing penicillin-resistant gonococcus I. PHILIPS (1976). *Lancet*, **2,** 656
Penicillin-producing *Neisseria gonorrhoeae* W. A. ASHFORD, R. G. GOLASH AND V. G. HEMMING (1976). *Lancet*, **2,** 657
***Neisseria gonorhoeae* producing penicillinase** (1976). *WHO Weekly Epidemiological Record*, **38,** 293

Penicillin has been the drug of choice for the treatment of gonococcal infections for many years, although some relative resistance of *N. gonorrhoeae* has been noted. However, recent evidence suggests

that the future value of penicillin in therapy may be in doubt.

Penicillin and cephalosporins are known to be susceptible to a number of enzymes (penicillinases and cephalosporinases) which attack the β-lactam ring found in the molecules of these antimicrobials. Twenty years ago, staphylococcal β-lactamase caused serious problems because it inactivated benzylpenicillin. This problem was controlled by the development of the isoxazoyl penicillins—for example, cloxacillin, and the cephalosporins. However, the introduction of broad spectrum antimicrobials containing β-lactam rings —for example, ampicillin and cephalosporins—was followed by the appearance of β-lactamase-producing Gram-negative bacteria. The development of sensitive techniques for the identification of these enzymes has produced evidence of β-lactamase activity in a wide range of Gram-negative organisms, including *N. gonorrhoeae* (Sykes and Matthew, 1976). The presence of the enzyme could be shown in the case of *N. gonorrhoeae* only by the sensitive iso-electric focusing technique. However, in the above reports, strains of *N. gonorrhoeae* isolated from patients are described which produce readily detectable amounts of β-lactamase and show a high resistance to penicillin.

Philips describes the isolation of such a strain from a patient in London who had pelvic inflammatory disease. The minimum inhibitory concentration of penicillin to this organism varied from 0·5 μg/ml to 128 μg/ml, depending on the size of the inoculum used, a performance characteristic of β-lactamase producing organisms. When the 3-disc method of sensitivity testing was used, no zone of inhibition was observed around any disc. β-lactamase was detected by the chromogenic cephalosporin test, whereby action of the enzyme produces a red colour. Further evidence of β-lactamase activity was obtained by comparing the action of a sonicated extract of the organism on a solution of penicillin, compared with an untreated penicillin solution, on *Bacillus subtilis* seeded on to agar plates. Finally, the iso-electric point of the enzyme was determined by the iso-electric focusing method. The organism was resistant to penicillin, ampicillin, and cephaloridine particularly with a heavy inoculum. Other sensitivities (except to streptomycin) were typical of *N. gonorrhoeae*.

The second report, by Ashford *et al.*, is of the isolation of a penicillinase-producing strain of *N. gonorrhoeae* from a male patient with urethritis who was examined in California; he had recently returned from south east Asia. Despite treatment with procaine penicillin 4·8 m.u. intramuscularly with probenecid 1 g p.o. and erythromycin 500 mg 6 hourly for nine days, the gonococcal urethritis persisted. The patient was eventually cured with spectinomycin 4 g intramuscularly. The presence of a β-lactamase was confirmed with the chromogenic cephalosporin test. Subsequently five further β-lactamase producing strains have been recovered from 42 unselected isolates.

Following these and other reports, the WHO has requested laboratories to seek other β-lactamase producing strains in an effort to establish the scale of the problem. A procedure for screening isolates found to be resistant to a 10 μg penicillin disc for β-lactamase is given in the WHO report; a rapid iodometric method is recommended.

The appearance of strains of *N. gonorrhoeae* resistant to penicillin is rightly viewed with concern. Further knowledge of the epidemiology of these strains will no doubt indicate the extent to which treatment schedules may have to be revised.

G. L. Ridgway

Reference

Sykes, R. B., and Matthew, N. (1976). *Journal of Antimicrobial Chemotherapy*, **2,** 115

Susceptibility of *Neisseria gonorrhoeae* to 66 antibacterial agents *in vitro*

M. FINLAND, C. GARNER, C. WILCOX AND L. D. SABATH (1976). *Journal of the American Venereal Disease Association*, **2,** 33

Recent isolates of *Neisseria gonorrhoeae* were tested for susceptibility to 64 antibiotics, including well-established ones and some currently under investigation, and to trimethoprim and sulfamethoxazole, separately and combined. The replica inoculator and undiluted cultures were employed. Amoxicillin, epicillin, ampicillin, and benzylpenicillin were equally active, but two new analogues were appreciably more active. Erythromycin was as active as benzylpenicillin on a weight basis, but rifampin was more active. Tetracycline was less active than the analogues, chloramphenicol was more active and spectinomycin less active than tetracycline. Clindamycin and two other analogues were superior to lincomycin. The penicillinase-resistant penicillins, the cephalosporins and the aminoglycosides were much less active than benzylpenicillin. All strains were essentially resistant to the polymyxins, bacitracin, vancomycin, and trimethoprim but the trimethoprim-sulfamethoxazole combination was quite active. Increases in resistance of *N. gonorrhoeae* were noted only to benzylpenicillin, tetracycline, bacitracin, and sulfonamides whereas susceptibility apparently increased to chlortetracycline and neomycin. Factors other than the inhibitory concentration of the drug for the infecting organism may be of equal or greater importance in the choice of an agent for the treatment of gonococcal infections.

Authors' summary

The activity of penicillin and eight cephalosporins on *Neisseria gonorrhoeae*

I. PHILLIPS, A. KING, C. WARREN AND V. WATTS (1976). (Statistical Appendix M. W. STOATE) *Journal of Antimicrobial Chemotherapy*, **2,** 31

Minimum inhibitory concentrations of penicillin and eight cephalosporins were determined on solid media for fresh isolates of *Neisseria gonorrhoeae*. Against penicillin-sensitive strains, the order of activity was cefuroxime (which was as active weight-for-weight as benzyl-penicillin), cefamandole, cefoxitin, cephalothin, cefazolin, cephradine, cephalexin, and cephaloridine. Some of the agents, notably cefoxitin, cephaloridine, cefuroxime, and cefazolin were relatively more active against penicillin-insensitive strains, for which the order of effectivness was cefuroxime (which was as active as ampicillin), cefoxitin, cefazolin, cefamandole, cephalothin, cephaloridine, cephalexin, and cephradine. Clinical trials of cefuroxime, cefoxitin, cefazolin and cefamandole might be worth while.

Authors' summary

Penicillinase-producing Gonococci

(Letter) G. C. TURNER, J. G. RATCLIFFE AND D. ANDERSON (1976). *Lancet*, **2,** 793

Penicillinase-producing Gonococci

(Leading Article) (1976). *British Medical Journal*, **2,** 963

Penicillinase-producing Gonococci

(Leading Article) (1976). *Lancet*, **2,** 725

Non-specific genital infections

Factors affecting the sensitivity of replicating McCoy cells in the isolation and growth of *Chlamydia A* (TRIC agents) F. W. A. JOHNSON AND D. HOBSON (1976). *Journal of Hygiene*, **76**, 441

Normal non-irradiated McCoy cell cultures provide a sensitive and reproducible method for the isolation of oculogenital strains of *Chlamydia A* directly from human secretions and for laboratory studies with these agents. Since September 1973, *Chlamydia* has been isolated from 175 of 562 women (32·1%) attending venereal disease clinics. Freshly isolated and low passage strains have been used to determine the importance of centrifugation, constitution and pH of the tissue culture medium, and the temperature of incubation in controlling the efficiency of plating in the method.

Authors' summary

Simplified serological test for antibodies to *Chlamydia trachomatis*

B. J. THOMAS, P. REEVE AND J. D. ORIEL (1976). *Journal of Clinical Microbiology*, **4**, 6

Three hundred and sixty sera from unselected patients attending two London venereal disease clinics were examined by a microimmunofluorescence test. Eleven egg-grown serotypes of *Chlamydia trachomatis* and the so-called 'fast' strain $SA_2(f)$ were used as antigens. Of the 360 sera tested, 119 (33%) reacted to a titre of 1:16 or above with at least one antigen. Of these positive sera, over 50% cross-reacted with all 12 serotypes, and 95·5% reacted with $SA_2(f)$ in addition to other antigenic types. It is suggested that $SA_2(f)$ could be used as a single antigen for preliminary screening of a large number of sera for the presence or absence of chlamydial antibody.

Authors' summary

The lack of effect of ampicillin plus probenecid given for genital infections with *Neisseria gonorrhoeae* on associated infections with *Chlamydia trachomatis*

J. D. ORIEL, G. L. RIDGWAY, P. REEVE, D. C. BECKINGHAM AND J. OWEN (1976). *Journal of Infectious Diseases*, **133**, 568

Forty-six men were successfully treated with a single oral dose of ampicillin (2 g) plus probenecid (1 g) for urethral infections with *Neisseria gonorrhoeae*. *Chlamydia trachomatis* was isolated from cultures of cells obtained from 11 of these men both before and after treatment; *C. trachomatis* was isolated from one man before but not after treatment and from three men after but not before treatment. No isolates were obtained from the remaining 31 men either before or after treatment. Of the 15 patients whose cultures yielded *C. trachomatis*, 12 developed postgonococcal urethritis; of the 31 patients from whose cultures no isolate was obtained, five developed postgonococcal urethritis. Of 44 women successfully treated with ampicillin plus probenecid for cervical infections with *N. gonorrhoeae*, 18 had *C. trachomatis* isolated from the cervix both before and after treatment. *C. trachomatis* was isolated from five women before but not after treatment and from two women after but not before treatment. No isolates were obtained from the remaining 19 women either before or after treatment. Thus ampicillin plus probenecid in the dosage used rarely eliminated *C. trachomatis* from the genital tract of either men or women. Whereas men with a persisting chlamydial infection will probably develop post gonococcal urethritis and thus receive appropriate treatment, such an infection in women is not likely to be suspected unless attempts are made to isolate *C. trachomatis*.

Authors' summary

Tetracycline-resistant T-mycoplasmas (*Ureaplasma urealyticum*) from patients with a history of reproductive failure

M. S. SPAEPEN, R. B. KUNDSIN AND H. W. HORNE (1976). *Antimicrobial Agents and Chemotherapy*, **9**, 1012

The susceptibilities of T-mycoplasmas (*Ureaplasma urealyticum*) to minocycline, demeclocycline, doxycycline, tetracycline, and erythromycin were determined by a direct tube dilution test. T-mycoplasma-positive urine sediments of 105 patients with a history of reproductive failure were used as inocula. Minocycline was found to be the most active of the group of antibiotics commonly used to eradicate T-mycoplasma infection. Based on the median initial minimum inhibitory concentration, minocycline was the lowest with 0·03 μg/ml, followed by demeclocycline and doxycycline with 0·125 μg/ml, tetracycline with 0.25 μg/ml, and erythromycin with 2·0 μg/ml. Six T-mycoplasma isolates which had been cloned three times were also tested for susceptibility to the same five antibiotics. The same susceptibility pattern was found. Strains resistant to high concentrations of all antibiotics occurred. Strong positive correlation was seen in 21 patients between *in vitro* highly resistant strains and positive post-treatment cultures. These results indicate that empirical treatment of genital mycoplasma infections is not justified. Cultures should be taken pretreatment, susceptibility testing performed before treatment, and follow-up cultures done after treatment.

Authors' summary

Growth and effects of ureaplasmas (*T. Mycoplasmas*) in bovine oviductal organ cultures

O. H. V. STALHEIM, S. J. PROCTOR AND O. E. GALLAGHER (1976). *Infection and Immunity*, **13**, 915

Ureaplasmas isolated from the human genital tract and from the genital and respiratory tracts of cattle were grown in association with organ cultures of bovine oviduct (uterine tube). All strains of ureaplasmas multiplied in organ cultures, stopped ciliary activity, and caused histological lesions. Most strains grew well, and 10^8 to 10^9 colour-changing units were determined 18 to 144 h after inoculation. Twenty-four to 144 h after inoculation with ureaplasmas, ciliostasis was complete. Ciliostasis was also caused by additions of non-viable cultures at pH 8·8 (or adjusted to 7·4) or washed disrupted cells (100 μg of protein/ml); it occurred in 48 to 96 h. The cilia-stopping effect of non-viable cultures was diminished by heating (56°C for 30 min) and was abolished by boiling. When added to fresh medium in amounts exceeding 25%, non-viable ureaplasmal cultures completely inhibited ureaplasmal growth. By light, scanning, and transmission electron microscopy, cilia-stopping effect was correlated with collapse and sloughing of the cilia (the initial lesion was 'bent' cilia), with bulging and vacuolisation of secretory and ciliated cells, and finally with disorganisation of the epithelium, necrosis and desquamation.

Authors' summary

Genital chlamydial infections
S. J. RICHMOND AND P. F. SPARLING (1976). *American Journal of Epidemiology*, **103**, 428

Chlamydia ophthalmia neonatorum (case report) D. W. CHARTERS AND E. REES (1976). *New Zealand Medical Journal*, **83**, 82

The human placenta as a possible reservoir of chlamydial infection in northern Canada J. C. WILT, P. C. WILT, N. KORDOVA AND C. MARTIN (1976). *Canadian Journal of Public Health*, **67**, 114

Mycoplasmas in humans: Significance of *Ureaplasma urealyticum*
R. B. KUNDSIN (1976). *Health Laboratory Science*, **13**, 144

Trichomoniasis

Comparison of four techniques for the routine diagnosis of *Trichomonas vaginalis* infection
P. R. MASON, H. SUPER AND P. J. FRIPP (1976). *Journal of Clinical Pathology*, **29**, 154

The authors examined material from 495 women attending a gynaecological unit and a family planning clinic. Smears were taken from the vagina and were microscopically examined after staining with Giemsa, Papanicolaou stain, or acridine orange. Papanicolaou-stained cervical smears were also studied, and vaginal exudate cultured on Feinberg-Whittington medium.

By at least one technique, 231 patients were found to be infected with *T. vaginalis*. Papanicolaou-stained films yielding the most positive results (171). There was however, no statistically significant difference between these results and those obtained using acridine orange as a stain (164). Both techniques were superior to examination of Giemsa-stained films (95/495) and culture (109/495), in the diagnosis of infection. Cytological examination of cervical smears detected the presence of *T. vaginalis* more often than routine examination of Papanicolaou-stained vaginal films (40% of 313 cervical smears positive, compared with 24% of 182 vaginal films), but it was considered that this difference was accounted for by differences in methods of collection of specimens rather than by differences in staining.

Only 70% of infections detected by examination of Papanicolaou-stained cervical smears could be confirmed by other techniques. More than 90% of positive results obtained using acridine orange staining methods could be otherwise confirmed.

It was concluded that due to the rapidity and simplicity of the acridine orange staining schedule this could be adopted as a routine diagnostic technique.

A. McMillan

Candidosis

A simple technique for observing germ tube formation in *Candida albicans*
R. Y. CARTWRIGHT (1976). *Journal of Clinical Pathology*, **29**, 267

Hyland immunoplates are filled with 4 ml of 0·1% glucose in 2% agar, which is then streaked with yeasts (nine isolates in parallel). This technique provides a convenient method for the production and direct microscopical examination of germ tubes (and chlamydospores) by *C. albicans*.

Betty Partridge

Germ tube formation from zonal rotor fractions of *Candida albicans*
W. LAJ. CHAFFIN AND S. J. SOGIN (1976). *Journal of Bacteriology*, **126**, 771

Genital herpes

Use of biological characteristics to type *Herpesvirus hominis* Types 1 and 2 in diagnostic laboratories
S. MARKS-HELLMAN AND N. HO (1976). *Journal of Clinical Microbiology*, **3**, 277

Herpesvirus hominis (HVH) can be differentiated on the basis of antigenic and biological differences into two groups, Type 1 and Type 2. Serological tests used to detect antigenic differences are complicated procedures for routine diagnostic virology laboratories. This paper assesses the value of three biological characteristics for typing HVH: pock size on the chicken embryo chorioallantoic membrane, heparin sensitivity, and plaque size on chicken embryo cell cultures. Fifty unknown clinical isolates from different sources were typed by these three biological methods and 19 of these isolates were also typed serologically. Heparin sensitivity, though the quickest and simplest test to perform, gave discordant results in several instances. The ability to form plaques in chick cell monolayers was the most reliable of the biological tests and gave 100% concordance with the serotyping results. This plaque test alone may allow diagnostic laboratories to distinguish between HVH Types 1 and 2.

Shirley Richmond

Anal infection caused by herpes simplex virus E. JACOBS (1976). *Diseases of the Colon and Rectum*, **19**, 151

Biological conditions influencing the focal necrotic hepatitis test for differentiation between herpes simplex virus types 1 and 2
S. C. MOGENSEN (1976). *Acta pathologica et microbiologica Scandinavica*, **84**, 154

Detection of type-specific antibody to herpes simplex virus types 1 and 2 in human sera by complement-fixation tests
G. R. B. SKINNER, C. HARTLEY AND J. E. WHITNEY (1976). *Archives of Virology*, **50**, 323

Oncogenesis and Herpesviruses II. Part 1. Biochemistry of Viral Replication and *in vitro* transformation. Part 2. Epidemiology, Host Response and Control
IARC Scientific Publications No. 11 (Proceedings of Symposium in Nuremburg, October 1974). International Agency for Research on Cancer (Lyon, France) 1975, 511 pages.

Prospects for herpesvirus vaccination—Safety and efficacy considerations
W. P. PARKS AND F. RAPP (1975). *Progress in Medical Virology*, **21**, 188

Miscellaneous

Evaluation of a new technique for the demonstration of gonococci and other micro-organisms in host cells
C. SOWTER AND Z. A. MCGEE (1976). *Journal of Clinical Pathology*, **29**, 433

During a study of the interactions of gonococci with organ cultures of Fallopian tube tissues, these workers found that staining of tissue sections by Gram's technique was unsatisfactory, owing to

the lack of differentiation between tissue elements and Gram-negative bacteria. A new histopathological staining technique was developed, and compared with five other known methods including that of Gram. Organ cultures of Fallopian tube tissue were infected with strains of *Staphylococcus aureus*, *Pseudomonas aeruginosa*, or *Neisseria gonorrhoeae*. After 24 hours incubation the tissues were fixed in one of four fixatives: Bouin's solution, formol saline, formol sublimate, or van de Grift's solution. After dehydration, clearing and embedding in paraffin wax, sections were cut and stained. The six stains used were: Gram, Murray-Drew, Brown-Hopps, Brown-Brenn, Gram-Twort and Gram-methyl green-pyronin-light green (Gram MGPLG). The Gram MGPLG technique was developed during this study. With this method, tissue elements stain blue or green, Gram-positive organisms magenta, and Gram-negative organisms scarlet. Van de Grift's fixative was found to give the best intensity of staining and brilliance of colour with Gram MGPLG stain.

When these staining techniques were compared, there was found to be little difference between the methods for Gram-positive organisms; with the Murray-Drew technique both cocci and cell nuclei stained blue. However, with Gram-negative organisms the superior cytological detail and differentiation of tissue from bacteria made the Gram MGPLG technique the method of choice.

This technique should prove of use in both routine and experimental work involving the differentiation of Gram-negative organisms in tissues, particularly where low magnifications are to be used for examination.

G. L. Ridgway

Cytomegalic virus disease in pregnancy
U. EACHEMPATI AND R. E. WOODS (1976). *Obstetrics and Gynaecology*, **47**, 615

HL-A antigens in Behçet's disease
J. D. O'DUFFY, H. F. TASWELL AND L. R. ELVEBACK (1976). *Journal of Rheumatology*, **3**, 1

Sexually transmissible diseases
T. N. EVANS (1976). *American Journal of Obstetrics and Gynaecology*, **125**, 116

Three years' experience in a sexual problems clinic
J. BANCROFT AND L. COLES (1976). *British Medical Journal*, **1**, 1575

The doctor and the homosexual
F. C. DONNELLY (1976). *The New Zealand Medical Journal*, **83**, 322

Book Review

Sexually Transmitted Diseases.
Edited by R. D. Catterall and C. S. Nicol, 1976. Pp. 274. 53 tables, 34 figs. Academic Press, London (£7·80)

The book comprises the proceedings of the Anglo-American conference on Sexually Transmitted Diseases held at the Royal Society of Medicine in June 1975. The coverage is wide and provided by experts in their fields from both sides of the Atlantic. Epidemiology and health education are given as much prominence as clinical and laboratory aspects. All of the articles are readable and enhanced by the discussion at the end of each section. There is much of interest but particularly impressive is the prophetic paper by Falkow's group on the possibility of plasmid-mediated penicillin resistance in the gonococcus. The account of gonococcal serotypes by Gotschlich is obviously of great potential importance. After an excellent review of genital herpetic infection by Nahmias, Roizman and Frenkel analyse critically the association between genital herpes and cervical carcinoma. All should read this article.

Anyone interested in the sexually transmitted diseases will want to read this book. By present-day standards the price is not excessive.

P. Rodin